I CLAIM:

1. Hydraulic actuating device (10) for an automotive friction clutch (12), with a master cylinder (14) whose master piston (16) can be impinged upon with a master force (F_G) via an actuating mechanism (18) and can be displaced by a master travel (S_G) as master variables and a slave cylinder (20) with a slave piston (22) which is hydraulically connected in series to the master piston (16) via a liquid column, which is functionally linked with a clutch-release member (24) of the automotive friction clutch (12), characterised by an adjusting unit (26) comprising an adjusting piston (28) hydraulically connected in series with the master piston (16) or parallel thereto, which can be impinged upon with a force and displaced via a transmission (30) that is driven by an electric motor (M) and a control unit (C), which can control the electric motor (M) subject to one of the master variables (F_G, S_G) or a variable (p_G) substantially proportional thereto, in order in the case of the connection in series of the master piston (16) and the adjusting piston (28) specifically to increase the force acting on the liquid column by impinging the adjusting piston (28) with a force or in the case of the parallel connection of the master piston (16) and the adjusting piston (28) specifically to increase the volume of the liquid column by the displacement of the adjusting piston (28).

2. Actuating device (10) according to claim 1, characterised in that to detect the master variable (F_{Gist}, S_{Gist}) or the variable substantially proportional thereto (p_{Gist}), a first sensor device (90, 104, 104',106, 106', 116) is provided with a signal connection to the control unit (C).

3. Actuating device (10) according to claim 2, characterised in that to detect a variable different from the variable (F_{Gist}, S_{Gist}, p_{Gist}) detected by the first sensor device (90, 104, 104', 106, 106', 116), a second sensor device (94, 108, 110, 118) is provided which has a signal connection to the control unit (C).

4. Actuating device (10) according to any one of the preceding claims, characterised in that the master cylinder (14) is hydraulically connected to the slave cylinder (20) by a first pressure line (86), in which the liquid column between the master piston (16) and the slave piston (22) is displaceable, whereby, for parallel connection of the master piston (16) and the adjusting piston (28), the adjusting unit (26) is hydraulically connected via a second pressure line (88) to the first pressure line (86) so that by the displacement of the adjusting piston (28) via the transmission

(30) driven by the electric motor (M), the volume of the liquid column between the master piston (16) and the slave piston (22) may be specifically increased.

5. Actuating device (10) according to claim 4, characterised in that the first sensor device (90) can detect the master travel (S_{Gist}) as a reference value, while a second sensor device (94) can detect an adjusting travel (S_{Sist}) of the adjusting piston (28) or a slave travel (S_{Nist}) of the slave piston (22) as a control variable, whereby subject to the master travel (S_{Gist}) detected, a desired value for the adjusting travel (S_{Ssoll}) of the adjusting piston (28) or the slave travel (S_{Nsoll}) of the slave piston (22) can be determined in the control unit (C) and whereby the adjusting travel (S_{Ssoll}) or slave travel (S_{Nsoll}) can be adjusted via the electric motor (M) of the adjusting unit (26) which is controlled by the control unit (C.

6. Actuating device (10) according to claim 5, characterised in that the control unit (C) comprises a computation element (R) by means of which the desired value for the adjusting travel (S_{Ssoll}) or the slave travel (S_{Nsoll}) can be determined according to the following relationship:

$$S_{Ssoll} = k_u * S_{Gist} \text{ or } S_{Nsoll} = k_u * S_{Gist}$$

where S_{Gist} is the master travel of the master piston (16) detected by the first sensor device (90) and

k_u is a transfer factor stored in a storage element (S) of the control unit (C).

7. Actuating device (10) according to claim 6, characterised in that the transfer factor (k_u) is constant.

8. Actuating device (10) according to any one of claims 1 to 3, characterised in that the adjusting piston (28) is arranged for the connection in series of the master piston (16) and the adjusting piston (28) between the master piston (16) and the slave piston (22), whereby the adjusting piston (28) divides the liquid column between the master piston (16) and the slave piston (22) into a master section between the master piston (16) and the adjusting piston (28) and a slave section between the adjusting piston (28) and the slave piston (22) and whereby the force acting on the slave section of the liquid column can be specifically increased by impinging a force upon the adjusting piston (28) via the transmission (30) driven by the electric motor (M).

9. Actuating device (10) according to claim 8, characterised in that the second sensor device (108) can detect a slave pressure (p_{Nist}) in the slave section of the liquid column as a reference value, while the first sensor device (104, 104') can detect a master pressure (p_{Gist}) in the master section of the liquid column or the master force (F_{Gist}) as a control variable, whereby, subject to the slave pressure (p_{Nist}) detected, a desired value for the master pressure (p_{Gsoll}) or the master force (F_{Gsoll}) can be determined in the control unit (C) and whereby the master pressure (p_{Gsoll}) determined or the master force (F_{Gsoll}) determined can be adjusted via the electric motor (M) of the adjusting unit (26) which is controlled by the control unit (C).

10. Actuating device (10) according to claim 9, characterised in that the control unit (C) comprises a computation element (R) by means of which the desired value for the master pressure (p_{Gsoll}) or the master force (F_{Gsoll}) can be determined according to the following relationship:

$$p_{Gsoll} = 1/k_V * p_{Nist} \text{ or } F_{Gsoll} = A_G/k_V * p_{Nist}$$

where p_{Nist}: is the slave pressure in the slave section of the liquid column detected by the second sensor device (108),

k_V: is an amplification factor stored in a storage element (S) of the control unit (C) and

A_G: is the hydraulic effective area of the master piston (16).

11. Actuating device (10) according to claim 10, characterised in that the control unit (C) has a correction element (K) by means of which the amplification factor (k_V) may be corrected in accordance with the following relations subject to the clutch wear:

$$k_V = k_{V0} * (p_{Nmax0} + \Delta p_{Nmax}) / p_{Nmax0}$$

whereby

$$\Delta p_{Nmax} = p_{Nmaxist} - p_{Nmax0}$$

where k_{V0} is a fixed amplification factor stored in the storage element (S) of the control unit (C) for an non-worn clutch (12),

p_{Nmax0} is a fixed value stored in the storage element (S) of the control unit (C) for a maximum slave pressure in the slave section of the liquid column with a non-worn clutch (12) and

$p_{Nmaxist}$ is the maximum slave pressure detected in the slave section of the liquid column by the second sensor device (108).

12. Actuating device (10) according to claim 8, characterised in that the second sensor device (110) can detect a slave travel (s_{Nist}) of the slave piston (22), an adjusting travel (s_{Sist}) of the adjusting piston (28) or the master travel (s_{Gist}) of the master piston (16) as a reference value, while the first sensor device (106, 106') can detect a master pressure (p_{Gist}) in the master section of the liquid column or the master force (F_{Gist}) as a control variable, whereby, subject to the detected slave travel (s_{Nist}), adjusting travel (s_{Sist}) or master travel (s_{Gist}), a desired value for the master pressure (p_{Gsoll}) or the master force (F_{Gsoll}) can be determined in the control unit (C) and whereby the master pressure (p_{Gsoll}) determined or the master force (F_{Gsoll}) determined can be adjusted via the electric motor (M) of the adjusting unit (26), which is controlled by the control unit (C).

13. Actuating device (10) according to any one of claims 1 to 3, characterised in that the master piston (16) is arranged for the connection in series of the master piston (16) and the adjusting piston (28) between the adjusting piston (28) and the slave piston (22), whereby the master piston (16) divides the liquid column between the adjusting piston (28) and the slave piston (22) into a servo section between the adjusting piston (28) and master piston (16) and a pressure section between the master piston (16) and slave piston (22) and whereby the force acting on the pressure section of the liquid column may be specifically increased by impinging force upon the adjusting piston (28) via the transmission (30) driven by the electric motor (M).

14. Actuating device (10) according to claim 13, characterised in that the second sensor device (118) can detect a slave travel (s_{Nist}) of the slave piston (22), the master travel (s_{Gist}) of the master piston (16) or an adjusting travel (s_{Sist}) of the adjusting piston (28) as a reference value, while the first sensor device (116) can detect the master force (F_{Gist}) as a control variable, whereby, subject to the slave travel (s_{Nist}), master travel (s_{Gist}) or adjusting travel (s_{Sist}) detected, a desired value for the master force (F_{Gsoll}) can be determined in the control unit (C) and whereby the master force (F_{Gsoll}) determined may be adjusted via the electric motor (M) of the

adjusting unit (26), which is controlled by the control unit (C).

15. Actuating device (10) according to claim 12 or 14, characterised in that the control unit (C) comprises a storage element (S) in which a desired curve ($p_{Gsoll} = f(s_{Sist})$; $F_{Gsoll} = f(s_{Gist})$) for the control variable (p_G, F_G) over the reference value (s_N, s_S, s_G) is stored, from which an assigned desired value for the control variable (p_{Gsoll}, F_{Gsoll}) can be determined for each actual value for the reference value (s_{Nist}, s_{Sist}, s_{Gist}) detected by the second sensor device (110, 118).

16. Actuating device (10) according to any one of the preceding claims, characterised in that the master piston (16) is pretensioned in a basic position by a return spring (36), in which position the pressure chamber (34) of the master cylinder (14) is hydraulically connected to a reservoir (40).

17. Actuating device (10) according to claim 16, characterised in that in the case of the connection in series of the master piston (16) and the adjusting piston(28), the adjusting piston (28) is also pretensioned in a basic position by a pretensioning spring (78) in which position a pressure chamber (76) of the adjusting unit (26) is hydraulically connected to a reservoir (40).

18. Actuating device (10) according to any one of the preceding claims, characterised in that the transmission (30) of the adjusting unit (26) is a spindle drive.

19. Actuating device (10) according to any one of the preceding claims, characterised in that the electric motor (M) of the adjusting unit (26) is a brushless DC motor.